SPACE

Mars Science Laboratory Mission

Agreement Between the
UNITED STATES OF AMERICA
and SPAIN

Amending the Agreement of
March 17, 2011

Signed at Le Bourget June 16, 2015

NOTE BY THE DEPARTMENT OF STATE

Pursuant to Public Law 89—497, approved July 8, 1966 (80 Stat. 271; 1 U.S.C. 113)—

". . .the Treaties and Other International Acts Series issued under the authority of the Secretary of State shall be competent evidence . . . of the treaties, international agreements other than treaties, and proclamations by the President of such treaties and international agreements other than treaties, as the case may be, therein contained, in all the courts of law and equity and of maritime jurisdiction, and in all the tribunals and public offices of the United States, and of the several States, without any further proof or authentication thereof."

SPAIN

Space: Mars Science Laboratory Mission

Agreement amending the agreement of March 17, 2011.
Signed at Le Bourget June 16, 2015;
Entered into force June 16, 2015.

AMENDMENT

TO THE

IMPLEMENTATION AGREEMENT

BETWEEN

THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, of the one part,

AND

THE CENTER FOR THE DEVELOPMENT OF INDUSTRIAL TECHNOLOGY OF SPAIN

AND

THE NATIONAL INSTITUTE FOR AEROSPACE TECHNOLOGY "ESTEBAN TERRADAS" OF SPAIN, of the other part,

CONCERNING COOPERATION ON THE

MARS SCIENCE LABORATORY MISSION

The National Aeronautics and Space Administration of the United States of America (hereinafter referred to as "NASA"), of the one part, and the Centro para el Desarrollo Tecnológico Industrial (the Center for the Development of Industrial Technology of Spain, hereinafter referred to as "CDTI") and the Instituto Nacional de Técnica Aeroespacial "Esteban Terradas," through the Centro de Astrobiología, a joint center with the Consejo Superior de Investigaciones Científicas (hereinafter referred to as "INTA-CAB"), of the other part, hereinafter referred to as the "Parties" collectively or "Party" individually;

Recognizing the tremendous success of the Mars Science Laboratory ("MSL") mission, including the Spanish-provided Rover Environmental Monitoring Station ("REMS") and High-Gain Antenna ("HGA");

Desiring to continue their cooperation on the MSL mission under the Implementation Agreement ("IA") signed on March 17, 2011;

Wanting to build upon the MSL experiences to include cooperation on the planned NASA-led Interior Exploration using Seismic Investigations, Geodesy, and Heat Transport ("InSight") and Mars 2020 missions;

Have agreed as follows:

In accordance with Article 16 (Amendment and Extension), the IA shall be amended as follows:

Article 1 (Scope and Purpose of Cooperation) – Add the following new provisions as follows:

1.4 NASA's Science Mission Directorate is in charge of the development of the InSight mission, the twelfth selection of the Discovery Program, planned for launch in March 2016. Dr. W. Bruce Banerdt of NASA's Jet Propulsion Laboratory ("JPL") is the Principal Investigator ("PI") for the mission, which was selected through NASA's Announcement of Opportunity for the Discovery Program, AO NNH10ZDA007O. The InSight mission is planned as a single geophysical lander on Mars, designed to study the planet's deep interior. The mission seeks to understand the evolutionary formation of rocky planets, including Earth, by investigating the interior structure and processes of Mars. InSight also is expected to investigate the dynamics of Martian tectonic activity and meteorite impacts, which could offer clues about such phenomena on Earth. The international InSight science team is made up of researchers from Austria, Belgium, Canada, France, Germany, Japan, Spain, Switzerland, the United Kingdom, and the United States. INTA-CAB and CDTI plan to contribute the Temperature and Wind on InSight ("TWINS") sensors to the InSight mission. TWINS utilizes the flight spares of the REMS instrument on MSL. The TWINS activities shall be performed by INTA-CAB, with CDTI's contribution to such activities limited to the in-kind provision of the elements developed for the MSL mission and which can be used for TWINS, given that CDTI is co-owner of such elements.

1.5 In December 2012, NASA announced its plans to build a new rover for the 2020 launch opportunity that shall be based on the MSL model and utilize heritage components from MSL to maximize cost savings. The 2020 mission baseline is to re-fly the same surface X-band capability provided by the heritage HGA. Under this scenario, CDTI would provide the heritage HGA as flown on MSL.

Article 2 (NASA Responsibilities) – Add the following new provisions as follows:

In support of TWINS:

2.16 Manage and conduct the InSight project throughout the life of the mission, including development, integration, test, launch, landing, and surface operations of the InSight spacecraft;

2.17 Define the resources available on the InSight spacecraft for the TWINS sensors and make available reasonable accommodations for mass, power, and data rate requirements for the TWINS hardware;

2.18 Provide technical information on required sensor performance specifications, environments within which the TWINS sensors must operate, and interfaces with other InSight mission elements;

2.19 Provide overall payload management and system engineering, while conducting regular management and technical meetings to monitor TWINS progress and ensure TWINS sensor performance and compatibility with InSight mission technical and programmatic requirements;

2.20 Provide technical support, as agreed and required, for the development of the INTA-CAB- and CDTI-contributed TWINS sensors;

2.21 Provide overall program management, including regular performance feedback to the INTA-CAB TWINS Project Manager, as necessary;

2.22 Provide INTA-CAB and CDTI, along with any other partners or subcontractors, with the required InSight performance and requirements data, whether in the United States or abroad, necessary to develop TWINS science, measurement, and sensor requirements, and to plan for and support integration of the TWINS sensors with the InSight mission systems;

2.23 Provide the flight electronics interfacing the TWINS sensors to the spacecraft including the power and control electronics;

2.24 Integrate, test, and validate the TWINS sensors with the InSight spacecraft;

2.25 Organize and manage the InSight science team, including arranging science team meetings;

2.26 Return any engineering or flight model spares to INTA-CAB and CDTI at the completion of the InSight mission;

2.27 Participate in InSight science data analysis, publication, and dissemination of the InSight science results;

2.28 Consistent with the Committee on Space Research ("COSPAR") planetary protection policy and NASA directives, define material and biological contamination constraints for the InSight mission, and ensure that the integrated payload meets planetary contamination constraints;

In support of the HGA on Mars 2020:

2.29 Manage and conduct the Mars 2020 mission throughout the life of the mission, including development, integration, test, launch, landing, and surface operations;

2.30 Consistent with the COSPAR planetary protection policy and NASA directives, define material and biological contamination constraints for the Mars 2020 mission, and ensure that the integrated payload meets planetary contamination constraints;

2.31 Evaluate, with CDTI, the capabilities and status of the existing available HGA hardware remaining from MSL and make recommendations and decisions as to the acceptability of the proposed contributed elements to meet mission requirements based on the CDTI-furnished Technical Implementation Plan ("TIP");

2.32 Support CDTI and its contractors in its development of the HGA subsystem, including flight hardware, software, and support equipment;

2.33 Provide actuator electrical ground support equipment to support testing of the HGA subsystem;

2.34 Provide two fully space-qualified flight model actuators and one spare actuator;

2.35 Provide two fully space-qualified flight model rotary joints and one spare rotary joint;

2.36 Provide the cabling for the HGA, including one flight flex cable and one spare flex cable; and

2.37 Integrate, test, and validate the HGA subsystem with the 2020 rover.

Article 3 (CDTI and INTA-CAB Responsibilities) – Add the following new provisions as follows:

In support of TWINS:

3.17 Provide overall TWINS sensor management on all models (breadboard, engineering, and flight) with regular reporting to project and mission payload management at JPL as required;

3.18 Design, develop, integrate, test, calibrate, and deliver the TWINS sensors and support their operations throughout the life of the mission, including integration, test, and verification of the TWINS sensors at Lockheed Martin in Denver, Colorado, USA. The TWINS sensors include all elements required to meet the required TWINS performance including at a minimum:

a. three refurbished MSL booms, referred to here as TWINS sensors, including needed hardware protection items. Two of the booms are to be integrated and flown to Mars and one shall serve as a flight spare. "Remove Before Flight" covers and containers shall be included, as agreed to be necessary, to protect the sensors before flight;
b. the TWINS application software and data processing requirements needed to support the InSight mission; and
c. all modelling and ground support equipment required for integration on the spacecraft;

3.19 Ensure that material and biological contamination constraints are met, and that the Spanish-supplied TWINS sensors are capable of meeting project-specified encapsulation requirements, as necessary;

3.20 Provide to NASA the necessary interface, safety, and planetary protection information for accommodation of the Spanish-supplied TWINS sensors onto the spacecraft;

3.21 Support launch operations, as needed, with respect to the Spanish-delivered hardware and support equipment at the launch site;

3.22 Prepare sensor activity plans and commands, monitor and assess TWINS sensor performance, and support sensor anomaly/problem resolution;

3.23 Support the participation of the co-investigators from Spain throughout all mission phases;

3.24 Participate in InSight science team meetings as appropriate and required;

3.25 Maintain ground segment facilities to operate and process sensor data from the TWINS sensors;

3.26 Participate in InSight tactical operations and supply reduced preliminary data to the InSight project on a schedule adequate to support daily operations, including instrument deployment and ground-based event detection;

3.27 Participate in InSight science data analysis and provide, in coordination with NASA/JPL, the TWINS scientific data to the scientific community;

In support of the HGA on Mars 2020:

3.28 Evaluate, with NASA, as part of the TIP, the capabilities and status of the existing available HGA hardware remaining from MSL:

3.29 Develop the required flight models of the HGA subsystem in accordance with previous MSL specifications;

3.30 Test and calibrate the HGA subsystem flight models in accordance with previous MSL specifications;

3.31 Deliver to JPL one complete flight HGA subsystem, a flight spare antenna, and flight spare parts for the gimbal;

3.32 Provide to NASA the necessary interface, safety, and planetary protection information for accommodation of the HGA subsystem supplied hardware within the payload and spacecraft;

3.33 Support the integration, testing, and validation of the HGA subsystem as mutually agreed, at the Mars 2020 integration and test facilities at JPL;

3.34 Support launch operations as needed with respect to the HGA subsystem-delivered hardware and the relevant interfaces at Cape Canaveral, Florida, USA; and

3.35 Ensure material and biological contamination constraints are met on all HGA hardware.

Article 4 (Implementation and Program Management) – Add the following provisions as follows:

4.10 The NASA InSight Program Executive is responsible for the definition, integration, and assessment of all activities related to the InSight mission. The InSight Program Executive is also the principal point of contact for NASA in the performance of the InSight activities covered in this IA.

4.11 The NASA Mars 2020 Program Executive is responsible for the definition, integration, and assessment of all activities related to the Mars 2020 mission. The Mars 2020 Program Executive is also the principal point of contact for NASA in the performance of the Mars 2020 activities covered in this IA.

4.12 Each Party shall provide, on occasion, as mutually agreed, for their representatives to visit one another's facilities to participate in integration and testing and to observe, confer with, and advise the other Party in regard to aspects of design and development of compatible hardware interfaces, integration, and testing, as well as any activities required to assure safe, reliable operations of the hardware as part of the overall InSight and Mars 2020 systems.

Article 5 (Sharing and Distribution of Scientific Data) – Add the following provision as follows:

5.7 The InSight Archive Generation, Validation, and Transfer Plan shall establish the detailed rules and procedures by which the Parties shall treat the scientific data from the InSight mission.

Article 8 (Registration of Space Objects) – Add the following sentence before the last sentence of Article 8 as follows:

NASA shall also request that its Government register the InSight and Mars 2020 spacecraft as space objects in accordance with the Registration Convention. Exercise of jurisdiction and control over the InSight and Mars 2020 missions shall be subject to the relevant provisions of this IA.

Article 11 (Release of Results and Public Information) - Add the following provision as follows:

11.4 The Parties shall make the final results obtained from the InSight and Mars 2020 missions available to the general scientific community through publication in appropriate journals or by presentations at scientific conferences as soon as possible and in a manner consistent with good scientific practices.

Article 17 (Entry into Force and Term of IA) – Replace the first sentence of Article 17 as follows:

This IA shall enter into force upon signature and shall remain in force until December 31, 2025, unless terminated by one Party by providing at least ninety (90) days advance written notice to the other Party of its intent to terminate.

This Amendment shall enter into force upon signature by the Parties.

DONE at Le Bourget, on the 16th day of June, 2015, in three originals, in the English language.

FOR THE NATIONAL AERONAUTICS
AND SPACE ADMINISTRATION
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